Phoenix, March 18, 2007

Comments on Final Draft Version 2.0 ENERGY STAR® Requirements for External Power Supplies (EPS) from ON Semiconductor

Although we applaud EPA's initiative to include Power Factor in the version 2, we think that setting a fixed value of 0.9 for power factor is not the correct way of addressing electrical pollution and reducing the I^2R losses in the transportation and delivery infrastructure of electricity.

In line with our first comments, we strongly believe the requirements for Power Factor should follow the International Electrotechnical Commission's IEC61000-3-2 regulation on limits for harmonic current emissions.

Specifying a fixed value of 0.9 for true power factor may result in the dramatic consequence of killing the single stage architecture.

Killing the single stage architecture

The proposed power factor requirement would eliminate the single-stage topology that is one of the most cost-effective ways of building highly efficient external power supplies such as notebook adapters with a nameplate output power below 120 W.

Because it only has one stage, this architecture is inherently more efficient than the two-stage architecture.

The single stage architecture also brings a substantial economical advantage over the two-stage architecture. In effect, it offers a drastic reduction of the number of components: it only has 1 magnetic element, 1 high voltage MOSFET, 1 rectifier, and 1 integrated circuit.

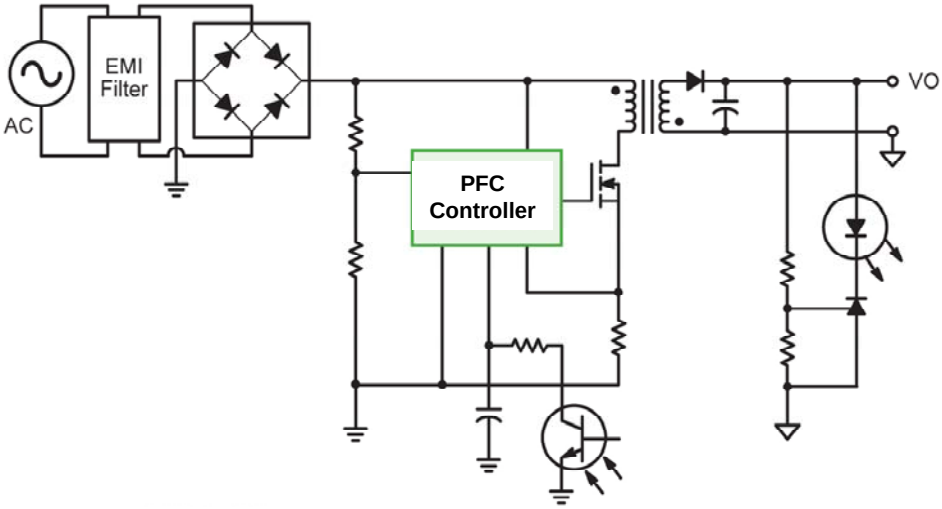

Figure 1: Single Stage Architecture

Because of the component count reduction, the single stage architecture can offer up to a 20% cost reduction when compared to the two-stage architecture.

By contrast, the two-stage architecture (Figure 2) has 2 magnetic elements, 2 high voltage MOSFETs, 2 rectifiers, and 2 integrated circuits.

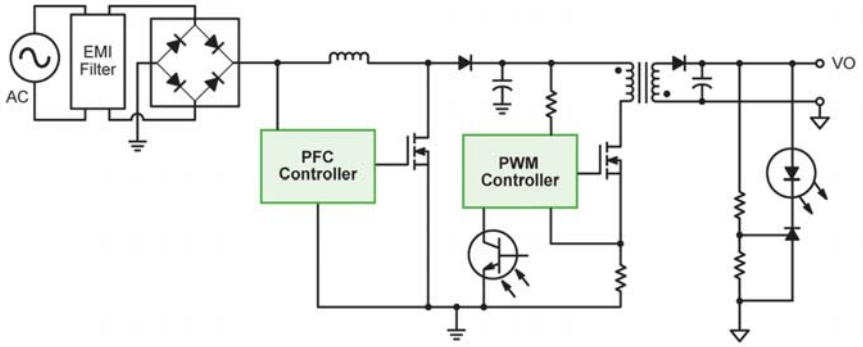

Figure 2: Two-Stage Architecture

Also, the single stage architecture utilizes less copper, less silicon, less plastic and less aluminium (used for heat sinks) than the two-stage architecture. In short, it utilizes fewer natural resources than the two-stage architecture.

Having a fixed Power Factor of 0.9 is going to kill the single stage architecture. This would be a dramatic consequence for the power supply industry.

Calculating the harmonic current levels for 115 V in the USA

Calculating the harmonic current levels for 115 V is a simple task. Take the levels specified in the European norm EN61000-3-2, which were calculated for 230 Vac, and multiply them by 2.

For example, the table here below shows the current levels for the first odd harmonics, for Class D equipments. These levels are calculated for 230 Vac. In order to determine the current levels for 115 Vac, multiply the values in the table by 2.

Harmonic order N	Maximum permissible harmonic per watt mA/W	Maximum permissible harmonic current A
3	3.4	2.30
5	1.9	1.114
7	1	0.77
9	0.5	0.40
11	0.35	0.33
etc…		

Table: Maximum Harmonic Current Levels for Class D Equipment @ 230 Vac

In summary, ON Semiconductor recommends that the power factor requirements in the final ENERGY STAR requirements for EPS version 2 should be harmonized with the international regulation IEC61000-3-2 which specifies maximum limits on harmonic currents.

Sincerely,

Christophe Warin,

Laurent Jenck

ON Semiconductor

5005 East McDowell Road

Phoenix, AZ 85044

USA

Contact persons:

Christophe Warin and Laurent Jenck

Christophe.Warin@onsemi.com and Laurent.Jenck@onsemi.com